9-65



# **Compactron Pentode** — **Gated-Beam Discriminator**

6**Z**10

The 6Z10 is a compactron containing a gated-beam discriminator and a beam pentode. The gated-beam discriminator is suitable for FM and TV limiter and discriminator applications, and the beam pentode for audio power output service.

## GENERAL

### ELECTRICAL

Cathode - Coated Unipotential

Heater Characteristics and Ratings Heater Voltage, AC or DC\*. . . 6.3±0.6 Volts Heater Current + . . . . . . 0.95 Amperes Direct Interelectrode Capacitances **Gated-Beam Discriminator Section** Grid-Number 1 to Grid-Number 3 . 0.009 Grid-Number 1 to All . . 4.4 Grid-Number 3 to All . **Pentode Section** Grid-Number 1 to Plate. . 0.22

#### MECHANICAL

Operating Position - Any Envelope - T-9, Glass Base - El2-70, Button 12-Pin Outline Drawing - EIA 9-58

Maximum Diameter. . . 1.188 Inches Minimum Diameter. Inches 1.062 Maximum Over-all Length 2.375 Inches Maximum Seated Height . . 2.000 Inches Minimum Seated Height . . . . 1.750 Inches

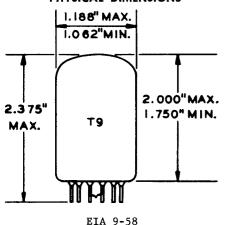
# **MAXIMUM RATINGS**

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supplyvoltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

#### PHYSICAL DIMENSIONS



# **TERMINAL CONNECTIONS**

Pin 1 - Heater

Pin 2 - Pentode Grid Number 2 (Screen)

Pin 3 - Pentode Cathode and Beam Plates

Pin 4 - Gated-Beam Discriminator

Pin 5 - Gated-Beam Discriminator

Grid Number 3 (Quadrature)

Pin 6 - Gated-Beam Discriminator Grid Number 2 (Accelerator)

Pin 7 - Gated-Beam Discriminator Grid Number 1

Pin 8 - Gated-Beam Discriminator Cathode and Internal Shields

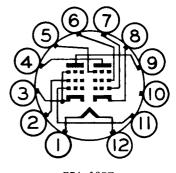
Pin 9 - Pentode Plate

Pin 10 - No Connection

Pin 11 - Pentode Grid Number 1

Pin 12 - Heater

### **BASING DIAGRAM**



EIA 12BT





# **MAXIMUM RATINGS (Cont'd)**

# **DESIGN-MAXIMUM VALUES**

<b>Gated-Beam Discriminator Sect</b>																
	lion															
Plate-Supply Voltage															. 330	Volts
Accelerator-Supply Voltage .		•			•	•									. 330	Volts
Peak Positive Grid-Number 1 Ve	oltage														. 60	Volts
DC Cathode Current	• •		·												. 13	Milliamperes
Heater-Cathode Voltage																•
Heater Positive with Respec	ct to	Cath	ode													
DC Component															. 100	Volts
DC Component Total DC and Peak															. 200	Volts
Heater Negative with Respec	et to	Cath	ode													
Total DC and Peak							•	•							. 200	Volts
Pentode Section																
															275	Volts
Plate Voltage		•	•	•	•	•	•	•	•	•	•	•			. 275	Volts
Screen Voltage		•	•	•	•	•	•	•	•	•	•	•	• •	• • •	. 273	Watts
Plate Dissipation Screen Dissipation		•	•	•	•	•	•	•	•	•	•	•	• •		2.0	Watts
Heater-Cathode Voltage	• •	•	•	•	•	•	•	•	•	•	•	•	• •	• • •	. 2.0	Watts
•	. t . t .	Cath	odo													
Heater Positive with Respec	נו נט	Gath	oue												100	Volts
DC Component Total DC and Peak		•	•	•	•	•	•	•	•	•	•	•			200	Volts
Heater Negative with Respec					•	•	•	•	•	•	•	•		• • •	. 200	10103
Total DC and Peak		Uati	ode												200	Volts
Grid-Number 1 Circuit Resista			•	•	•	•	•	•	•	•	•	•	• •			70200
With Fixed Rise				-				_		_	_				0.25	Megohms
With Fixed Bias With Cathode Bias	• •	•	•	•	•	•	•	•	•	•	•	•			. 0.5	Megohms
СНД	RAC	TER	IST	ГIС	S	AN	<b>JD</b>	T	ΥP	IC.	ΑL	O	PER	ATION		
<b></b>					•	~.	•	•							•	
<b>AVERAGE CHARACTERIS</b>	TICS															
Gated-Beam Discriminator Sect	ion															
Plate Voltage													135	135	135	Volts
Accelerator Voltage													75			Volts
Accelerator-Supply Voltage .														280	280	Volts
Accelerator Resistor														33000	33000	Ohms
Grid-Number 1 Voltage													0	0	0	Volts
Grid-Number 3 Voltage													+4.0	+4.0	0	Volts
Plate Current										•				5.0		VOICS
Accelerator Current							_									Milliamperes
Grid-Number 1 Transconductance	a						•	•		•	•	•	4.5			Milliamperes Milliamperes
GITU-NUMBEL I TTAMSCOMUCCAMC		•	•													Milliamperes
Grid-Number 3 Transconductance	e	•	•	:		•										Milliamperes Milliamperes
Grid-Number 3 Transconductance	э		•	:	•	•									360	Milliamperes Milliamperes Micromhos
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approxi	e imate	•	•	•	•	•	•	•	•	•	•	•			360	Milliamperes Milliamperes Micromhos
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx Ib = 20 Microamperes Grid-Number 3 Voltage, approx	e imate  imate	•		•	•	•		•	•	•	•	•			360 700	Milliamperes Milliamperes Micromhos Micromhos
<pre>Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx</pre>	e imate  imate	•		•	•	•		•	•	•	•	•			360 700	Milliamperes Milliamperes Micromhos Micromhos
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx Ib = 20 Microamperes Grid-Number 3 Voltage, approx Ib = 20 Microamperes	e imate  imate	•		•	•	•		•	•	•	•	•			360 700 -4	Milliamperes Milliamperes Micromhos Micromhos Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx Ib = 20 Microamperes Grid-Number 3 Voltage, approx Ib = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER	e imate  imate	•		•	•	•		•	•	•	•	•			360 700 -4	Milliamperes Milliamperes Micromhos Micromhos Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx. Ib = 20 Microamperes Grid-Number 3 Voltage, approx. Ib = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER Pentode Section	e imate  imate	•		•	•	•			•	•	•	•			360 700 -4 -4	Milliamperes Milliamperes Micromhos Micromhos Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate 1 b = 20 Microamperes  Grid-Number 3 Voltage, approximate 1 b = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section  Plate Voltage	imate imate									•		•			360 700 -4 -4	Milliamperes Milliamperes Micromhos Micromhos Volts Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate 1 b = 20 Microamperes Grid-Number 3 Voltage, approximate 1 b = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section Plate Voltage	imate imate														 360 700 -4 -4 -4	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate 1 b = 20 Microamperes Grid-Number 3 Voltage, approximate 1 b = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section  Plate Voltage  Screen Voltage	imate														. 250 . 250 -8.0	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate 1 Transconductance Ib = 20 Microamperes Grid-Number 3 Voltage, approximate 1 Transconductance Ib = 20 Microamperes	eimateimate														. 250 . 250 . 8.0	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate Ib = 20 Microamperes Grid-Number 3 Voltage, approximate Ib = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section Plate Voltage  Grid-Number 1 Voltage  Peak AF Grid-Number 1 Voltage Plate Resistance, approximate	e imate imate	•													. 250 . 250 . 8.0 100000	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Ohms
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate The 20 Microamperes Grid-Number 3 Voltage, approximate Transconductance	e imate imate														. 250 . 250 . 8.0 100000 6500	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Ohms Micromhos
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx Ib = 20 Microamperes Grid-Number 3 Voltage, approx Ib = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section  Plate Voltage Screen Voltage Grid-Number 1 Voltage Peak AF Grid-Number 1 Voltage Plate Resistance, approximate Transconductance Zero-Signal Plate Current	eimate														 360 700 -4 -4 -2 250 250 -8.0 8.0 100000 6500 35	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Ohms Micromhos Milliamperes
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx Ib = 20 Microamperes Grid-Number 3 Voltage, approx Ib = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section  Plate Voltage Screen Voltage Grid-Number 1 Voltage Peak AF Grid-Number 1 Voltage Plate Resistance, approximate Transconductance Zero-Signal Plate Current . Maximum-Signal Plate Current .	eimate														 360 700 -4 -4 -2 -4 -250 -8.0 -8.0 100000 6500 -35 -39	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Volts Micromhos Milliamperes Milliamperes
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approx Ib = 20 Microamperes Grid-Number 3 Voltage, approx Ib = 20 Microamperes  CLASS A <sub>1</sub> AMPLIFIER  Pentode Section  Plate Voltage Grid-Number 1 Voltage Grid-Number 1 Voltage Transconductance, approximate Transconductance Zero-Signal Plate Current . Maximum-Signal Plate Current .	eimate														. 250 . 250 . 250 . 8.0 100000 6500 . 35 . 39 . 3.0	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Volts Volts Micromhos Milliamperes Milliamperes Milliamperes
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate Tb = 20 Microamperes Grid-Number 3 Voltage, approximate Tb = 20 Microamperes  CLASS A1 AMPLIFIER  Pentode Section  Plate Voltage Screen Voltage Grid-Number 1 Voltage Peak AF Grid-Number 1 Voltage Plate Resistance, approximate Transconductance Zero-Signal Plate Current . Maximum-Signal Plate Current . Maximum-Signal Screen Current . Maximum-Signal Screen Current .	e imate														. 250 . 250 . 250 . 8.0 100000 6500 . 35 . 39 . 3.0	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Volts Volts Micromhos Milliamperes Milliamperes Milliamperes Milliamperes Milliamperes Milliamperes
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate Tb = 20 Microamperes Grid-Number 3 Voltage, approximate Tb = 20 Microamperes  CLASS A1 AMPLIFIER  Pentode Section  Plate Voltage  Screen Voltage  Grid-Number 1 Voltage  Peak AF Grid-Number 1 Voltage Plate Resistance, approximate Transconductance  Zero-Signal Plate Current .  Maximum-Signal Plate Current .  Maximum-Signal Screen Current .  Maximum-Signal Screen Current Load Resistance	e														. 250 . 250 . 250 . 8.0 100000 6500 . 35 . 39 . 3.0 . 13	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Volts Volts Micromhos Milliamperes Milliamperes Milliamperes Milliamperes Ohms
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate Tb = 20 Microamperes Grid-Number 3 Voltage, approximate Tb = 20 Microamperes  CLASS A1 AMPLIFIER  Pentode Section  Plate Voltage  Screen Voltage  Grid-Number 1 Voltage  Peak AF Grid-Number 1 Voltage Plate Resistance, approximate Transconductance  Zero-Signal Plate Current .  Maximum-Signal Plate Current .  Maximum-Signal Screen Current .  Maximum-Signal Screen Current .  Maximum-Signal Screen Current .  Toral Harmonic Distortion and	e imate imate	· · · · · · · · · · · · · · · · · · ·													. 250 . 250 . 250 . 8.0 100000 6500 . 35 . 39 . 3.0 . 13 5000	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Volts Micromhos Milliamperes Milliamperes Milliamperes Ohms Percent
Grid-Number 3 Transconductance Grid-Number 1 Voltage, approximate Tb = 20 Microamperes Grid-Number 3 Voltage, approximate Tb = 20 Microamperes  CLASS A1 AMPLIFIER  Pentode Section Plate Voltage Screen Voltage Grid-Number 1 Voltage Peak AF Grid-Number 1 Voltage Plate Resistance, approximate Transconductance Zero-Signal Plate Current . Maximum-Signal Plate Current . Maximum-Signal Screen Current . Maximum-Signal Screen Current Load Resistance	e imate imate	· · · · · · · · · · · · · · · · · · ·													. 250 . 250 . 250 . 8.0 100000 6500 . 35 . 39 . 3.0 . 13 5000	Milliamperes Milliamperes Micromhos Micromhos Volts Volts Volts Volts Volts Volts Volts Volts Volts Micromhos Milliamperes Milliamperes Milliamperes Milliamperes Ohms

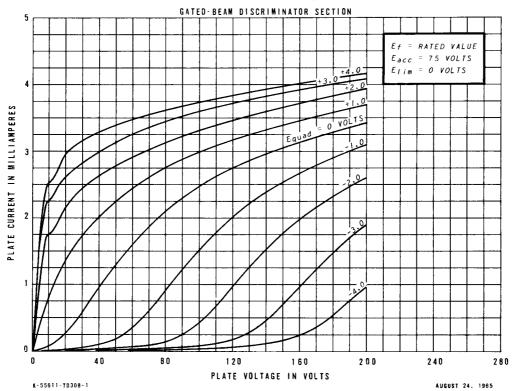
# **NOTES**

- \* The equipment designer should design the equipment so that heater voltage is centered at the specified bogey value, with heater supply variations restricted to maintain heater voltage within the specified tolerance.
- # Heater current of a bogey tube at Ef = 6.3 volts.
- § Without external shield.

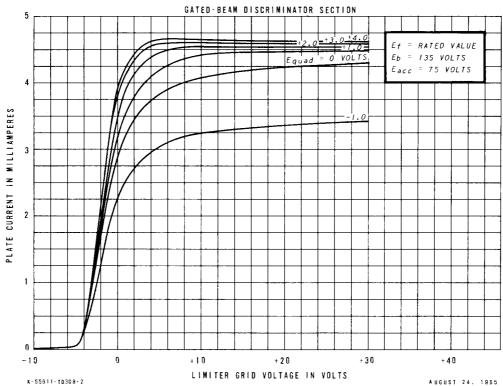
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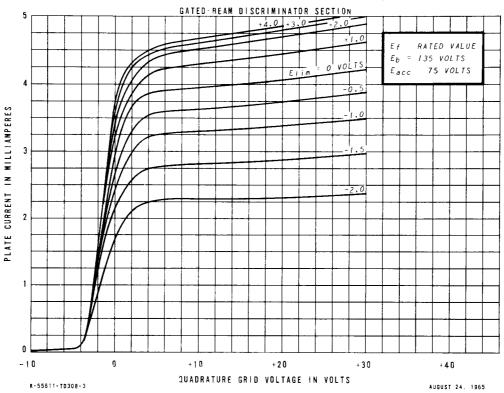
## **AVERAGE PLATE CHARACTERISTICS**



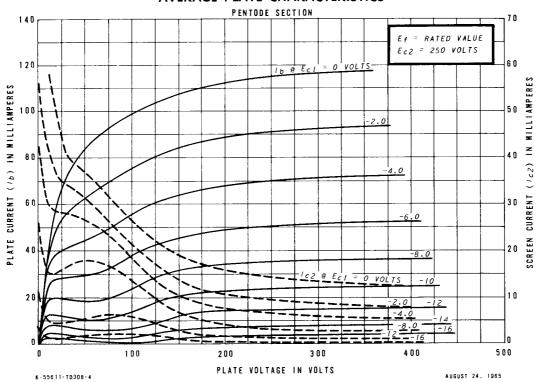
### **AVERAGE TRANSFER CHARACTERISTICS**



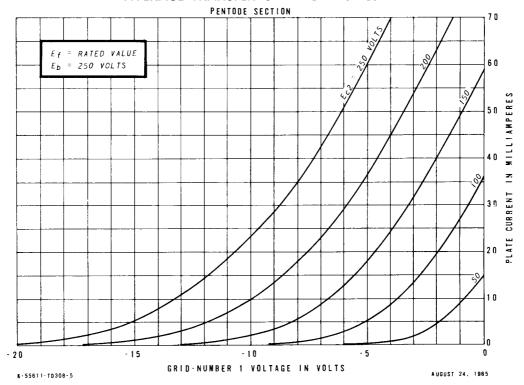
# **AVERAGE TRANSFER CHARACTERISTICS**



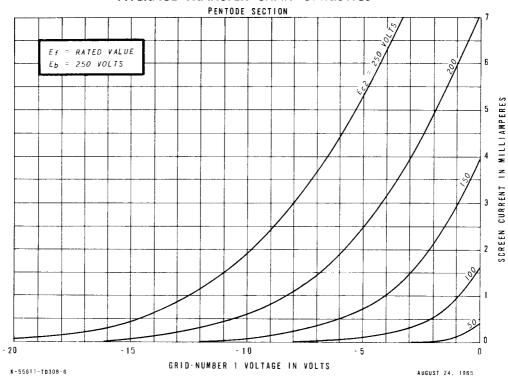
## **AVERAGE PLATE CHARACTERISTICS**



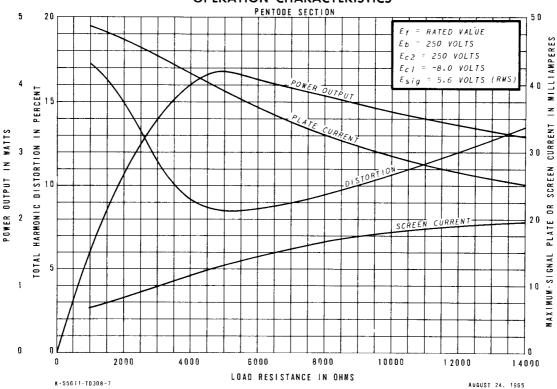
# **AVERAGE TRANSFER CHARACTERISTICS**



### **AVERAGE TRANSFER CHARACTERISTICS**



# **OPERATION CHARACTERISTICS**



TUBE DEPARTMENT



Owensboro, Kentucky